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ABSTRACT

A study investigated the reading responses of 60 eighth grade students to encoded inflectional, syntactic, grammatical, and semantic errors. The students were equally divided into three categories based on grade level reading competency and given three Aesopian fables to read. The text of the fables contained the following errors: (1) words to which inflectional and derivational suffixes had been added or deleted, (2) substitutions of one structure word for another, (3) substitution of antonyms for synonyms, and (4) substitution of the word "kelp" for the verb "keep." Each student read the fables orally and as rapidly as possible without knowing that errors had been inserted in the materials. The readings were recorded and analyzed to determine how each student responded to the errors. The overall performance of the students indicated that they were not overly sensitive to encoded errors. They were more proficient in intuitively correcting inserted errors that violated past tense, with regular past tense errors being corrected more frequently than irregular past tenses. They were least proficient in correcting inserted antonyms for synonyms, indicating that the students were less semantically aware than syntactically and grammatically aware. (FL)

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# Eighth Grade Students' Reading Responses to Encoded Inflectional, Syntactic, Grammatical and Semantic Errors

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## Introduction

Wolf (1977) suggests the verb read is one of the least ambiguous words in the English language. It is unambiguous because the public defines it as representing a process of extracting the meaning represented by a symbolic system of graphemes found in a book, periodical, on a billboard, etc. This idea, "...--that reading is no more than a mental interaction with the written word--is actually rather new; new, that is, when one considers the etymology of the word" (Wolf, 1977, p. 411). Wolf (1977) points out that "only in the English language and only in the last two centuries, has the word read come to mean almost exclusively the interpretation of written material" (p. 411). This verb has a Teutonic heritage and originally meant to give counsel, to take charge, to explain the obscure. The descendants of this word, in languages other than English, have as a prominant meaning the interpretation of something obscure.

In the latter half of the Twentieth Century, Miller's (1956) position that at any moment in time a person is cognitively limited to processing only about seven pieces of random information psychologically reinforced the unambiguous, English definition of reading. It not only reinforced this definition, it also established the parameters some researchers abided by in seeking to understand the reading

process. Even as late as 1972, Gough was still using Miller's (1956) "magical seven" to continue to define reading as a process of sequentially decoding each letter individually. Miller's position was not isolated to individual letters as interpreted by Gough (1972) and Kolers and Katzman (1966). Miller's slots are information slots in short-term memory which may extend beyond the temporal space required for seven letters of an alphabet.

A more liberal interpretation of Miller's seven slots lead to the idea of chunking. Chunking theory, as perceived by Miller (1956), Epstein (1961), Johnson (1965, 1966a, 1966b, 1968), and Osgood (1968), mathematically supports the fact that skilled reading occurs. Processing chunks larger than individual letters is essential for proficient reading. Johnson's work with oral language is important indirectly to reading because it makes it clear that simple item-to-item association cannot account for recall of sentences. His research indicates that chunks are formed which correspond to the phrase units of phrase-structure analysis. Johnson believes a central integrative process must occur before a response sequence is produced.

Johnson postulates a model of sentence production which indicates speakers completely plan an utterance, then decode it step-by-step in terms of phrase-structure rules. This model is entirely syntactic in nature which ignores the possibility that semantic content may contribute to the formation of utterance and force syntactic choice. Osgood (1968), unlike Johnson, believes semantic factors may be primary in language production. Osgood supposes that the semantic component of

language production may determine what levels of the phrase-structure tree encoding should go. Osgood suggests that in the psychological process of production, content is selected before it is ordered grammatically. Syntactic and semantic features for him are closely interrelated. Thus, Osgood differs with Chomsky (1965) in his (Chomsky's) proposal that syntactic structure is applied before semantic selection.

The idea of linguistic chunking, whether founded upon semantic or syntactic features, has been incorporated into theories which guide research on the reading process. Neisser's (1967) perception model, called "analysis-by-synthesis," depicts perception as an active process of construction. Through his model, Neisser describes rapid reading with this sentence: "In rapid reading, we attain a meaning without identifying individual words" (p. 136). In greater detail he writes:

> Where rapid reading is concerned...the end product of cognitive activity is not a bit of verbal behavior but a deep cognitive structure; not a verbalized name but a continuing silent stream of thought. Reading for meaning seems to be a kind of analysis-by-synthesis, a construction which builds a non-sensory structure just as 'lower level' of cognition synthesize visual figures of spoken words. Reading is externally guided thinking.

Neisser's concept of analysis-by-synthesis may explain why in rapid reading, such a large number of minor misprints go unnoticed by skilled readers. Back in 1897, Pillsbury studied this phenomena of errors in print going unnoticed by skilled readers. Unfortunately,

Pillsbury's work was not extended by scholars for over a half century. As Kolers (1970) points out:

> Despite the obvious complexity of the reading process, the greater number of investigators have sought relatively simple, strictly casual explanations of it. By strictly casual, I mean such simplistic theses as reading is principally the activating of conditional meanings, reading is principally a matter of discriminating the geometry of letters, and reading is a matter of translating graphemes into sounds. There have been few efforts since Huey's masterpiece in 1908 to deal with the whole phenomenon, to account for the variety of events that go into reading. (p. 90)

Ideas and research by psychologists like Miller (1956), Neisser (1967), and Kolers (1970) enlarged the focus on the reading process enough that some scholars began to think of reading as being an active rather than a passive cognitive response. What Pillsbury observed in 1897 began to attract scholarly attention again in the late 1960's. Biemiller's (1970) and Weber's (1970a, 1970b) descriptive analyses of reading errors revealed that these errors are powerful cues to use in explaining the reading process. This focus was different from Pillsbury's in that Biemiller and Weber looked at errors made by readers rather than errors overlooked.

Goodman (1969, 1973, 1976), Goodman and Goodman (1977, 1978), and Goodman and Burke (1972) have made the greatest contribution in using

error analysis to understand the reading process. Goodman and Gollasch (1980) have extended error analysis to word-omission and its portent for the reading process. They recommend that rather than just count omissions, they should be interpreted with reference to performance. They believe word omissions must be interpreted and evaluated in relationship to the whole reading process. They see omissions as surface representations of an underlying interaction between the reader and the text.

The Goodmans and their collaborators view reading as a dynamic, psycholinguistic process. It is an active process of applying inherent linguistic cues as they occur in running print. From a semantic perspective, the cues are cumulative. They are cumulative in the sense that they increase information. Information that adds to the reader's semantic awareness which enables the reader to be active in the creative process of acquiring the meaning represented by print or writing.

As a reader creatively brings his or her linguistic competence to the reading process, errors which the Goodmans define as being miscues frequently occur. The more proficient (Goodman & Goodman, 1977) a reader is in responding to linguistic cues inherent in running print, miscues are more apt to be semantically acceptable to the intent of the meaning represented by the graphemic system. Thus, the Goodmans have brought a positive perspective to what has been traditionally described as being errors in reading and treated negatively. They have used oral reading miscues as windows through which to observe the reading process and have found what traditionally have been called

errors to be products of a dynamic, creative application of linguistic competence as a reader seeks to acquire the meaning represented by print. The research of Williamson and Young (1974, 1977) corroborates that of the Goodmans and their collaborators.

## Method

### Design

The independent variables introduced into the experiment include: (1) Words on which were added or deleted inflectional and derivational suffixes. For plurality and past tense, words were included which take regular inflections for plurality (cup/cups) and for past tense (wade/waded) and words which do not take regular inflections for plurality (mouse/mice) and for past tense (go/went); (2) Substitutions of one structure word for another (with/for/and); (3) Substitution of antonyms for synonyms (up for down); and (4) Substitution of the word kelp for the verb keep.

The variables include: (1) A vocabulary score expressed in a percentile. The test on which subjects' performances yielded the percentile rank is the Comprehensive Test of Basic Skills (CTBS) published by Westinghouse Learning Corporation Educational Services; (2) grade level (9.5: fifth month into grade 9) of reading skill demonstrated by reading performance on the CTBS.

### Materials

Three Aesopian fables (The Lion and the Mouse, The Dog and the Shadow, The Town Mouse and the Country Mouse) were used. In the running

print of each of these fables, the following errors were inserted:

1. Past tense-regular inflection.

   a. Fable: The Lion and the Mouse

      Inserted error: waken for wakened

      Sentence: A huge lion, lying sound asleep, was wakened by a mouse when it ran across his face.

   b. Fable: The Dog and the Shadow

      Inserted error: decide for decided

      Sentence: A dog had a piece of meat so large and juicy that he decided to take it to a quiet place across the stream.

2. Past tense-irregular.

   a. Fable: The Lion and the Mouse

      Inserted error: catch for caught

      Sentence: Soon after that the lion got caught in a huge net the hunters had spread to trap him.

   b. Fable: The Town Mouse and the Country Mouse

      Inserted error: go for went

      Sentence: And so the country mouse went to town to visit his friend.

3. Plurality-regular inflection

   a. Fable: The Town Mouse and the Country Mouse

      Inserted error: container for containers

      Sentence: The town mouse showed him large containers of of flour, oatmeal, cheeses, and cakes.

b. Fable: The Lion and the Mouse

Inserted error: creatures for creature

Sentence: This offer made the lion laugh and in fact he was so amused at the idea that such a tiny creature could ever do anything for him that he let the mouse go.

4. Plurality-irregular.

a. Fable: The Dog and the Shadow

Inserted error: were for was

Sentence: There he saw his own reflection and thought that what he saw was another dog with another piece of meat, an even larger and juicier piece than his own.

b. Fable: The Lion and the Mouse

Inserted error: tooth for teeth

Sentence: At once, he started to gnaw the ropes with his sharp teeth.

5. Adding the -ing inflection.

a. Fable: The Dog and the Shadow

Inserted error: cross for crossing

Sentence: While he was crossing the bridge across the stream, he happened to look down at the water.

b. Fable: The Town Mouse and the Country Mouse

Inserted error: miss for missing

Sentence: You must come and visit me and see what wonderful food you are missing.

6. Adding -er comparative inflection.

   Fable: The Dog and the Shadow

   Inserted error: large for larger

   Sentence: There he saw 's own reflection and thought that what he saw was another dog with another piece of meat, an even larger and juicier piece than his own.

7. Adding the derivational suffix -ly.

   a. Fable: The Dog and the Shadow

      Inserted error: instant for instantly

      Sentence: Instantly he jumped into the stream, determined to seize the larger piece from the other dog.

   b. Fable: The Town Mouse and the Country Mouse

      Inserted error: hard for hardly

      Sentence: But they had hardly swallowed a mouthful when someone came in and the two mice had to scamper off.

8. Deleting the derivational suffix -ly.

   a. Fable: The Lion and the Mouse

      Inserted error: laughly for laugh

      Sentence: This offer made the lion laugh and in fact he was so amused at the idea that such a tiny creature could ever do anything for him that he let the mouse go.

   b. Fable: The Dog and the Shadow

      Inserted error: currently for current

Sentence: As he jumped, he dropped his own meat and the current carried it away.

9. Adding the derivational suffix -y.

Fable: The Dog and the Shadow

Inserted error: juice for juicy

Sentence: A dog had a piece of meat so large and juicy that he decided to take it to a quiet place across the stream.

10. Substitution of structure words.

Fable: The Town Mouse and the Country Mouse

a. Inserted error: with for and

Sentence: A country mouse once invited his friend the town mouse to come and visit him in the fields.

b. Inserted error: when for while

Sentence: After a while the mice returned to the feast.

c. Inserted error: of for in

Sentence: Again they huddled in the narrow hole.

d. Fable: The Lion and the Mouse

Inserted error: if for it (We recognize it is not a structure word. We use if here because of its graphic similarity to it.)

Sentence: The angry lion seized the mouse and was just about to kill it when he heard the little mouse begging for his life.

11. Substitution of antonyms for and other contrastive words to test semantic involvement.

Fable: The Dog and the Shadow

a. Inserted error: up for down

Sentence: While he was crossing the bridge across the stream, he happened to look down into the water.

b. Inserted error: smaller for larger

Sentence: Instantly he jumped into the stream, determined to seize the larger piece from the other dog.

c. Inserted error: something for nothing

Sentence: Since there was no other dog and no other meat, he gained nothing and lost what he had.

Fable: The Town Mouse and the Country Mouse

a. Inserted error: waste for taste

Sentence: The town mouse thought the country charming, but he found the food much too simple for his taste.

b. Inserted error: drink for eat

Sentence: Never before had the country mouse seen so many exciting things to eat.

c. Inserted error: confusion for peace

Sentence: I'd rather have a simple dinner of roots and enjoy it in peace.

Fable: The Lion and the Mouse

Inserted error: get for repay

Sentence: "Please let me go," cried the mouse, "and someday I'll repay you if you'll only spare me."

12. Non-sense kelp for keep

Fable: The Town Mouse and the Country Mouse

Inserted error: kelp for keep

Sentence: "You can keep your luxury," he said to his friend.

Procedure

Each subject was given the three fables and instructed to read them orally and as rapidly as possible. They were not told that errors had been inserted in the materials. Each S's reading was recorded by a cassette tape recorder. The recordings were carefully analyzed to see how S's responded to the inserted errors. No other aspects of the reading performance were considered.

Subjects

The S's participating in the experiment were eighth graders enrolled in the Alamogordo Public Schools. S's were not randomly selected. They were members of classes taught by one of the authors, Jimmie Bryant. The S's comprised three categories delineated by variation in the acquisition of reading skills as measured by performance on the CTBS. The three groups of 20 students each were equally divided into three categories based upon grade level reading competency. The high group ranged in grade level performance from 9.5 to 12.6. The grade level breakdown for this group follows.

| Grade Level | Number of S's |
|---|---|
| 12.6 | 4 |
| 12.3 | 3 |
| 12.1 | 2 |
| 11.6 | 2 |
| 11.1 | 1 |
| 10.6 | 2 |
| 10.1 | 3 |
| 9.5 | 3 |

The middle group ranged in grade level performance from 9.0 to 6.7. The grade level breakdown for this group is:

| Grade Level | Number of S's |
|---|---|
| 9.0 | 2 |
| 8.5 | 1 |
| 8.2 | 6 |
| 7.8 | 1 |
| 7.5 | 2 |
| 6.9 | 6 |
| 6.7 | 2 |

The low group ranged in grade level performance from 6.4 to 3.7. The breakdown is:

| Grade Level | Number of S's |
|---|---|
| 6.4 | 1 |
| 6.2 | 3 |
| 6.0 | 3 |

| Grade Level | Number of S's |
|---|---|
| 5.8 | 2 |
| 5.7 | 1 |
| 5.5 | 1 |
| 5.3 | 3 |
| 5.2 | 2 |
| 4.4 | 2 |
| 4.3 | 1 |
| 3.7 | 1 |

## Results and Discussion

### Subjects' Specific Performances

The idiosyncratic nature of linguistic performance causes individuals--whether speaking, reading, or writing--to produce peculiarities which are not systematic enough across members of a linguistic community for the purpose of scientific quantification. That is, it is almost impossible to find a systematic pattern in the peculiarities to generate the frequencies essential for statistical treatment. However, these idiosyncratic performances are indications of how a user of language is applying linguistic competence to generate a performance designed to use language to express cognitive information that is in a semantic domain. Miscues, as defined by the Goodmans, permits us to observe cognitive-linguistic interactions which occur as language users attempt to fuse what Chomsky (1965) refers to as surface and deep structures.

When subjects in this study did not correct an encoded error, they did not always passively read the print. In the reading process, the eye may compete with the mind and even at times this seemed to occur with the inserted error of if for it. Subjects in both the high and low achievers in acquisition of reading skills read it and then changed to if for a frequency of six times for each group. The middle group had a frequency of two for this type.

The substitution of the word help for the nonsense word kelp inserted for keep may also indicate keen competition between the eyes and the mind. Subjects in the low group read help for kelp seven times; three times for both the high and middle groups. The word help does not make sense in this sentence. But, it has a high graphic similarity to kelp.

Another common response was reading across for the inserted cross where crossing should have been. Again, the highest frequency (9) occurred for the low group; four for the high groups, and three for the middle group. If we look at the beginning of the sentence: While he was cross the bridge..., it makes sense to read across to get: While he was across the bridge. This clause by itself is acceptable grammatically. However, for the whole sentence, it is neither grammatically or semantically acceptable. It may be that these subjects reacted to this unit within the constraints of Miller's "magical number seven, plus or minus two," which defines limits on human capacity to process information.

It is interesting that for regular formation of past tense and plurality no departure from the texts occurred other than making corrections (decided for decide, containers for container). Three subjects (one in the highly proficient readers; two in the low proficient) read catched rather than caught for inserted catch. Also, in the irregular go-went tense paradigm, seven improvisations were made (high: two; average: two; low: two).

Three subjects (one high; two low) inserted goes where went should have been read. The word goes is grammatically correct for the isolated sentence: "And so the country mouse went/goes to town to visit his friend." But, it is not correct for the tense of the whole story. The word got was read five times (high: one; average: two; low: two) for the inserted go. The rendition of got for go in this sentence is grammatically and semantically acceptable for this individual sentence as well as for the whole story. It could be interpreted as a dialect variation.

For the expression of singularity embedded in the irregular form was of the verb: to be, three subjects (one in each group) omitted the inserted plural form were. That is, this required verb was omitted causing the sentence to read: "There he saw his own reflection and thought that what he saw ____ another dog with another piece of meat, an even larger and juicier piece than his own." This omission probably did not prevent the understanding that the dog thought he saw another dog. One subject in the average group of proficient readers inserted the word there where were replaces was. This insertion makes sense

when it is understood that this subject omitted the word what in this sentence.

For the irregular plural teeth for the singular tooth, there were no improvisations.

In the categories of adding the inflection -ing and -er, no improvisations occurred other than reading across for the inserted cross. This has already been discussed.

For the requirement of adding the derivational suffix - y to juice, no improvisations occurred. Only one subject, from the average group, improvised for the inserted errors which required the deletion of -ly (laughly, currently). This subject inserted the words laughing and certainly. Neither of these are appropriate syntactically, grammatically, or semantically.

Where adding -ly was required, subjects from the average group made no improvisations. Three subjects (high, one; low, two) read instead rather than the insertion instant for instantly. Using the word instead makes sense in the isolated sentence: "Instead he jumped into the stream, determined to seize the larger piece from the other dog." It breaks the smooth, semantic flow in the fable.

Two subjects in the low groups read heard where -ly had been deleted from hardly. This is inappropriate syntactically and grammatically. Perhaps, anticipation of what is to happen gives it some semantic credability. One subject from the high and low groups omitted the word hard without improvisation. The sentence reads smoothly and meaningfully with this omission. The message of the fable is not negatively affected.

Improvisations and omissions also occurred in response to inserted errors in the category of structure words. Information on subjects' performance when confronted with if for it has been discussed above. Where with was inserted for and, subjects in the average and low groups had two omissions for each group. Three subjects (high, one; average, two) read to where with was inserted for and. This improvisation is grammatically acceptable. The sentence, "A country mouse once invited his friend the town mouse to come to visit him in the fields," is acceptable to the semantic intent of this fable. One subject in the high group read the sentence this way: "A country mouse once invited his friend the town mouse to come visit with him in the field." This is an excellent improvisation in order to render the sentence grammatical. It reveals a high degree of linguistic competence.

One subject from the average group responded to the inserted with for and with the word out. This response did not rectify or ameliorate the encoded error. It only indicates that this subject was seeking to amend what he perceived to be incorrect. He was cognitively and linguistically active in his reading process.

For the of-in constrast, there was only one omission made by a subject in the low group of proficient readers. Another subject in the group inserted the word off. This made the sentence read: "Again they huddled off the narrow hole." This same response was given by three subjects in the average group and by one in the high group. One subject in the average group read it this way: "Again they huddled off to a narrow hole." The rendition of off implies the mice did not

enter the hole, but stopped short of it. The use of off to a is more semantically acceptable to the intent of the fable because it places the mice in a hole. The wording of the original sentence places them in a hole.

Two subjects in the middle group used the words near and over where of was inserted for in. Like the use of off, these two renditions place the mice out of the hole which is not the intent of the fable. However, the use of off, near and over makes the sentence, as an isolated unit, acceptable grammatically.

A subject in the middle group used the combination of a in an attempt to rectify the encoded error of of for in. Of course, it was not a successful attempt. But, it is a more positive effort than just reading the error as encoded.

Where when was inserted for while, there were no improvisations. There was one omission by a subject in the group of high proficient readers.

In the semantic category of inserted errors, subjects in the high groups made no improvisations or omissions. One subject in the middle group read the contraction I'll as I will, which precedes the inserted error of get for repay in the sentence "Please let me go," cried the mouse, "and someday I'll repay you if you'll only spare me now." This subject read get as it was in the fable. This was the only change which occurred among subjects in the average group.

Subjects in the low proficienct group were more active. One of these read give where get was inserted for repay. Even though the

word give here is not acceptable grammatically, it is closer to the semantic value of repay than is get.

In the sentence where the antonym up is substituted for down, subjects in the low group made two improvisations. Rather than read up or down, one subject read: "While he was crossing the bridge across the stream, he happened to look upon the water." This improvisation makes sense. It does not detract from the semantic intent of the story. The other improvisation involved using the word take rather than reading up or down. The subject read: "While he was crossing the bridge across the stream, he happened to take a look into the water." This was an excellent improvisation which supports the semantic intent of the fable.

There was one omission where up was inserted for down. This omission resulted in retaining the meaning which was disturbed by inserting up for down.

The other two improvisations by subjects in the low group occurred in the sentence where confusion was substituted for peace. One subject read conversation for confusion to get "I'd rather have a simple dinner of roots and enjoy it in conversation." This rendition is much more appropriate than using confusion. It fits the "environment" and "atmosphere" of the fable.

The other improvisation involved using the word concession. At first glance, this improvisation appears to create nonsense. But does it? The feast of oatmeal, cakes, and cheeses the two mice were attempting to enjoy was continuously interrupted by humans. They had to

scamper to a hole in which to hide again and again while they were trying to eat. This subject has this information when he comes to the final word confusion which has been inserted for peace. He reads the last two sentences: "You can keep your luxury," he (the country mouse) said to his friend. "I'd rather have a simple dinner of roots and enjoy it in concession."

This reader recognized the word confusion did not represent what the country mouse meant. It did not make sense in the context of the fable. When this subject became aware that the last word he was reading was violating the intent of the fable, he had already read its first syllable: con. Rather than continue with the next syllable, -fu-, he improvised -ces-, and read the word as concession. Now, perhaps, he had the idea represented by succession, meaning to him that the country mouse preferred to eat in succession a dinner of simple roots rather than a city feast interrupted so many times.

It would be difficult to verify this scenario. It could have been discussed with the reader. However, caution would have to be taken not to lead him into this interpretation of this specific performance.

This discussion of subjects' improvisations and omissions is a direct result of the Goodmans' work in literacy. Their research and ideas are teaching us to approach errors as miscues. This approach allows for a positive interpretation of what was once relegated to the negative category of errors. They have shown us how to use miscues as windows through which to see the reader actively involved in the reading process. What we see through these windows are meaningful scenes.

Subjects in the low proficient reading group made a total of 39 improvisations and six omissions compared to 25 improvisations and three omissions for the average group and 22 and three for the high group. Members of the low group were more active in creating improvisations and in omissions in all the categories with the exception of structure words in which the average group had eight improvisations and two omissions to the low groups' one improvisation and three omissions. For this category, the high group had six improvisations and one omission.

Statistical Analyses

The errors were inserted in the three fables in order to establish a systematic pattern that could be statistically analyzed. The Goodmans' research (Goodman & Gallasch, 1980) has followed a naturalistic methodology which analyzes uncontrolled behavior in tasks in which variables are uncontrolled. Guba (1978) defined the naturalistic methodology which the Goodmans follow. By inserting errors systematically, the variables were controlled in this study. Gladney and Krulee (1967), in a study to determine the influence of syntactic errors on sentence recognition, substituted introduced errors in place of subject noun, the main verb and the object noun. They inserted adjectives and adverbs where these nouns and verbs appear. This study found that errors introduced in place of the main verb were uniformly more disruptive than were errors in either the subject or object position. Errors introduced into either the subject or object positions have about equally disruptive effects.

In this study, disruptiveness was not considered. The focus was to see if subjects' responses to the introduced errors differed significantly with reference to reading achievement as measured by the Comprehensive Tests of Basic Skills. The 60 eighth grade subjects were equally divided into three groups. The reading comprehension levels of all the subjects ranged from 3.7 to 12.6. The subjects defined as being low proficient readers ranged in reading comprehension levels from 3.7 to 6.4. The groups defined as being average proficient readers ranged in comprehension from 6.7 to 9.0; the high proficient readers varied from 9.5 to 12.6.

A total of 29 errors were introduced into the three Aesopian fables. Subjects in the high proficient reading group had a mean of 26.85% for correcting introduced errors. That is, these S's corrected 26.85% of the 29 inserted errors. The average groups' mean was 17.85%; the low group, 20.30%. The *t* value for the average and low groups are not significantly different at the .05 level of significance for the one-tailed test.

The *t* values for the high group and the average group differed significantly at the .025 level for the one-tailed test, and at .05 for the two-tailed test. Subjects' performances in the high and low groups differed, as measured by *t* values, at the .10 level of significance for the two-tailed test and .05 for the one-tailed test.

The low groups' higher mean (20.30) of percentage corrected over the average groups' mean (17.85) may appear as an anomaly since it would be expected for the average group to have a mean percentage of

corrected errors between that of the high and low groups. However, from the positive perspective of miscues developed by the Goodmans, it is not an anomaly. The subjects in the low group are actively seeking to improve their reading as demonstrated by the 39 improvisations they made as opposed to the 25 for the average group and the 22 for the high group. It could appear as if the high and average groups of subjects have "arrived" while those in the low group are still on the road. Members of the low group are more active cognitively and should be expected to make as many or more corrections of the encoded errors as made by those in the average group. It could be argued that the goal of most reading instruction is to develop readers like the subjects in the average group.

Table 1 presents the overall performance of the three groups by categories, type of errors encoded, and the number corrected and percentage are given for each group of subjects.

As can be seen in Table 1, all subjects were less efficient in correcting inserted semantic errors. They were most proficient in correcting: (1) regular past tense; (2) adding the comparative -er; (3) adding the derivational suffix -y; and (4) correcting the nonsense word.

To determine if correction of encoded errors by subjects could be used to predict or estimate reading comprehension, the statistical tool of multiple regression was used to interpret the raw data. The weighted sums of the predictor variables of correcting the various types of inserted errors were calculated to determine which one of

Table 1

Number of and Percentage of Inserted

Error Types Corrected by Subjects in Each Group

| Types of Inserted Errors | High Group 9.5 - 12.6 N=20 | | Average Group 6.7 - 9.0 N=20 | | Low Group 3.7 - 6.4 N=20 | |
|---|---|---|---|---|---|---|
| | No Corrected | % | No Corrected | % | No Corrected | % |
| Past Tense | | | | | | |
| Regular (Total = 40)* | 22 | 55 | 18 | 45 | 18 | 45 |
| Irregular (Total = 40) | 17 | 42.5 | 11 | 27.5 | 12 | 30 |
| Plurality | | | | | | |
| Regular (Total = 40) | 15 | 37.5 | 9 | 22.5 | 10 | 25 |
| Irregular (Total = 40) | 11 | 27.5 | 2 | 5.0 | 6 | 15 |
| Adding -ing (Total = 40) | 12 | 30 | 6 | 15 | 7 | 17.5 |
| Adding -er (Total = 20) | 12 | 60 | 9 | 45.6 | 9 | 45 |
| Derivational -ly | | | | | | |
| Adding (Total = 40) | 14 | 35 | 5 | 12.5 | 11 | 27.5 |
| Deleting (Total = 40) | 10 | 25 | 7 | 17.5 | 4 | 10 |
| Derivational -y | | | | | | |
| Adding (Total = 20) | 9 | 45 | 7 | 40 | 13 | 65 |
| Structure Words (Total = 80) | 15 | 18.75 | 12 | 15 | 14 | 17.5 |
| Semantic Corrections (Total = 140) | 6 | 3.3 | 3 | .016 | 1 | .006 |
| Nonsense Word Correction (Total = 20) | 10 | 50 | 10 | 50 | 10 | 50 |
| Total Corrections (Total = 560) | 151 | 27 | 100 | 18 | 115 | 20 |

* Total number in parentheses refers to the number of chances subjects in each group had to correct that type of inserted error. The number was derived by multiplying the number of subjects (20) by the number of a specific type of inserted error. For example, in the semantic category, there are seven encoded errors (20 x 7 = 140).

them can be used to best predict reading comprehension and vocabulary proficiency. For predicting vocabulary proficiency, the following values were derived:

| Variable | Multiplier R | R Square |
|---|---|---|
| 1. Combination of adding and deleting -ly | 0.439 | 0.192 |
| 2. Add -y | 0.489 | 0.239 |
| 3. Combination of regular and irregular past tense | 0.529 | 0.280 |
| 4. Add -ly | 0.537 | 0.289 |
| 5. Regular past tense | 0.544 | 0.296 |
| 6. Irregular plural | 0.548 | 0.300 |
| 7. Nonsense word | 0.550 | 0.302 |
| 8. Regular plural | 0.552 | 0.305 |
| 9. Combination of regular and irregular plurality | 0.564 | 0.319 |
| 10. Correction of all inserted errors | 0.568 | 0.322 |
| 11. Structure words | 0.575 | 0.330 |
| 12. Add -ing | 0.5762 | 0.3320 |
| 13. Add -er | 0.5766 | 0.3325 |
| 14. Semantic correction | 0.5768 | 0.3327 |

As indicated by these data, the adding and deleting of the derivational suffix -ly has the greatest predictive value for vocabulary

competence. Again, proficiency for adding and deleting -ly was the best predictor. The top five variables for predicting reading comprehension shared four with vocabulary competence (combination of adding and deleting -ly, adding -y, combination of correcting regular and irregular past tense, and correcting irregular past tense). The variable of semantic correction was fourth in predictive value for reading comprehension where it was fourteenth for vocabulary. For predicting reading comprehension, the following values were derived:

| Variable | Multiplier R | R Square |
|---|---|---|
| 1. Combination of adding and deleting -ly | 0.381 | 0.145 |
| 2. Adding -y | 0.440 | 0.194 |
| 3. Combination of correcting regular and irregular past tense | 0.493 | 0.243 |
| 4. Semantic correction | 0.503 | 0.253 |
| 5. Irregular past tense | 0.514 | 0.264 |
| 6. Structure words | 0.522 | 0.273 |
| 7. Adding -ing | 0.525 | 0.276 |
| 8. Regular plural | 0.528 | 0.278 |
| 9. Irregular plural | 0.530 | 0.280 |
| 10. Combination of regular and irregular plurals | 0.534 | 0.286 |
| 11. Correction of all inserted errors | 0.537 | 0.289 |
| 12. Nonsense word | 0.540 | 0.292 |
| 13. Add -ly | 0.541 | 0.293 |
| 14. Add -er | 0.5415 | 0.2933 |

Torres (1980) found college freshmen's skill in recognizing inserted syntactic errors while silently reading accounted for over 50% of the

variability in comprehension. He analyzed the weighted sums of college freshmen's sensitivity to inserted errors in the categories of inflections, syntax, grammar and semantics to determine which performance was the best predictor of reading comprehension. Syntax was.

## Conclusions

The overall performance of the subjects indicate that they are not too sensitive to encoded errors. Subjects were more proficient in intuitively correcting inserted errors which violated past tense with regular past tense errors being corrected more frequently than irregular past tense. The subjects were also better at intuitively reading "over" a nonsense word as well as adding the comparative -er and the derivational suffix -y. They were least proficient in correcting inserted antonyms for synonyms (nothing/something, up/down, larger/smaller). This indicates that the subjects were less semantically aware than they were syntactically and grammatically.

With reference to reading models as reviewed by Stanovich (1980), the subjects in this study performed more in accordance with an interactive-compensatory model of reading fluency rather than to a bottom-up or a top-down model. Stanovich defined a bottom-up model as one which delineates the reading process as proceeding "from the incoming data to higher-level encodings" (p. 33). In top-bottom models, "higher-level processes interact with, and direct the flow of, information through lower-level processes" (p. 34). The reader samples textual information to test hypotheses. The reading process is seen as being driven by higher-level conceptual processes, rather

than by the print on the page. In contrasting the bottom-up and the top-down models, Stanovich wrote, "In short, top-down analyses start with hypotheses and then attempt to verify them by processing the stimulus, whereas bottom-up analyses start by processing the stimulus" (p. 34).

Stanovich believes Rumelhart (1977) provides the best example of an interactive model. This model assumes "that a pattern is synthesized based on information provided simultaneously from several knowledge sources such as feature extraction, orthographic knowledge, lexical knowledge, syntactic knowledge, and semantic knowledge" (Stanovich, 1980, p. 35). Differentiating top-down models from interactive models, Stanovich wrote, "In top-down models, semantic processes direct lower-level processes, whereas in interactive models, semantic processes contain the alternatives of lower levels, but are themselves constrained by lower-level analyses" (p. 35). The interactive model is also compensatory in that it assumes that "a deficit in any knowledge source results in a heavier reliance on other knowledge sources, regardless of their level in the processing hierarchy" (Stanovich, 1980, p. 63).

The performance of the subjects in this study appeared not to rely on the semantic intent of the fables when confronted with many of the contradictions established by inserting antonyms. When corrections were read "through" or "over" the inserted errors, the intuitive correcting appeared to be more related by what a word preceding the encoded error required of that word to be correct grammatically. Some

examples are: (The word or words requiring the intuitive correction is/are underlined. The encoded error and the intuitive correction are separated by a slash.)

1. A tiny creatures/creature
2. A piece of meat so large and juice/juicy
3. An even large/larger and juicier piece
4. had hard/hardly swallowed a mouthful
5. showed him large container/containers of flour, oatmeal, cheeses and cakes

Some words after the encoded error are underlined because the eye span of the reader leads the voice. Thus, the information the eye "feeds" the mind before the voice speaks could cause the intuitive correction. If this occurred, then the interactive model is correct when indicating that feature extraction, orthographic information, lexical knowledge, syntactic knowledge and grammatical knowledge as well as semantic knowledge propel the reading process.

The 39 improvisations made by the subjects in the low group of proficient readers compared to 25 for the average group and 22 for the high group support Coomber and Hogie's (1974) finding that poor readers are more sensitive to spelling pattern violations than are good readers. Stanovich (1980) reported that there is much more evidence now to support the Coomber and Hogie position.

The overall performance of the poor readers in this study may indicate that an interactive model more accurately describes the poor reader's reading performance than it does the more proficient reader.

Certainly, the less proficient readers in this report were groping much more for a language production that made sense linguistically and semantically than were the average and high proficient readers. This search is a strength that should be capitalized upon in instruction designed to help poor readers become more skillful.

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